

ABSTRACT OF THE DISCLOSURE

Methods for de-differentiating or altering the life-span of desired "recipient" cells, e.g., human somatic cells, by the introduction of cytoplasm from a more primitive, less differentiated cell type, e.g., oocyte or blastomere are provided. These
5 methods can be used to produce embryonic stem cells and to increase the efficiency of gene therapy by allowing for desired cells to be subjected to multiple genetic modifications without becoming senescent. Such cytoplasm may be fractionated and/or subjected to subtractive hybridization and the active materials (sufficient for de-differentiation) identified and produced by recombinant methods.